

No.

200400062



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Wisconsin Alumni Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR PLANT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (34 U.S.C. 2681-2686, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

OAT

'Drumlin'



In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-fourth day of November, in the year two thousand and four.

Attest:

[Signature]

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

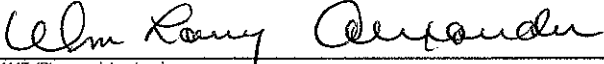
[Signature]
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Wisconsin Alumni Research Foundation		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME X7822-3		3. VARIETY NAME Drumlin	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 614 North Walnut Street P.O. Box 7365 Madison, Wisconsin 53707-7365		5. TELEPHONE (include area code) (608) 263-2500		FOR OFFICIAL USE ONLY PVPO NUMBER 20 0400062 FILING DATE JANUARY 20, 2004	
		6. FAX (include area code) (608) 263-1064			
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation		8. IF INCORPORATED, GIVE STATE OF INCORPORATION WI		9. DATE OF INCORPORATION November 14, 1925	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Wm. Larry Alexander Patterson, Thunte, Skaar & Christensen, P.A. 4800 IDS Center 80 South 8th Street Minneapolis, Minnesota 55402-2100				FILING AND EXAMINATION FEES: \$ 3652.00 DATE 1-20-2004 CERTIFICATION FEE: \$ 432.00 DATE 9/07/2004	
11. TELEPHONE (Include area code) (612) 349-5757		12. FAX (Include area code) (612) 349-9266		13. E-MAIL alexander@ptsllaw.com	
14. CROP KIND (Common Name) Oat		16. FAMILY NAME (Botanical) Gramineae		18. DOES THE VARIETY CONTAIN ANY TRANSGENES? (OPTIONAL) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF SO, PLEASE GIVE THE ASSIGNED USDA-APHIS REFERENCE NUMBER FOR THE APPROVED PETITION TO DEREGULATE THE GENETICALLY MODIFIED PLANT FOR COMMERCIALIZATION.	
15. GENUS AND SPECIES NAME OF CROP <u>Avena sativa L.</u>		17. IS THE VARIETY A FIRST GENERATION HYBRID? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
19. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$3,652), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)				20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act) <input type="checkbox"/> YES (If "yes", answer items 21 and 22 below) <input checked="" type="checkbox"/> NO (If "no", go to item 23) 21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED 22. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED (If additional explanation is necessary, please use the space indicated on the reverse.)	
23. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)				24. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
25. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER 			SIGNATURE OF OWNER		
NAME (Please print or type) Wm. Larry Alexander			NAME (Please print or type)		
CAPACITY OR TITLE Attorney for Owner		DATE 16 January 2004		CAPACITY OR TITLE DATE	

(See reverse for instructions and information collection burden statement)

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$3,652 (\$432 filing fee and \$3,220 examination fee), payable to "Treasurer of the United States" (See Section 97.6 of the Regulations and Rules of Practice.) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$432 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvpo/pvp.htm>

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority and provide evidence that name has been cleared by the appropriate recognized authority before the Certificate of Protection is issued. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, 10301 Baltimore Avenue, Suite 401 NAL Building, Beltsville, MD 20705. Telephone: (301) 504-5682 <http://www.ams.usda.gov/lsg/seed.htm>.

ITEM

- 19a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 19b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 19c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 19d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 19e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
20. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (See Regulations and Rules of Practice, Section 97.103).
23. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
24. See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.

22. CONTINUED FROM FRONT (Please provide a statement as to the limitation and sequence of generations that may be certified.)

23. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)

First distribution of foundation seed to certified seed growers was in March, 2003, in Wisconsin, U.S.A.

24. CONTINUED FROM FRONT (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. The fees for filing a change of address; owner's representative; ownership or assignment; or any modification of owner's name is specified in Section 97.175 of the regulations. (See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Exhibit A
Drumlin Oat
Wisconsin

EXHIBIT A: ORIGIN AND BREEDING HISTORY OF THE VARIETY

DRUMLIN OAT (Wisconsin selection X7822-3)

The pedigree of Drumlin is:

MN89252/Gem

The pedigree and chronology of crosses is diagrammed and shown in Figure 1.

Drumlin was developed by workers in the Department of Agronomy, University of Wisconsin-Madison, Madison, Wisconsin. The breeding history of Drumlin is unique in that (1) one of the progenitors was a 6X amphiploid from a tetraploid x diploid interploidy cross, and (2) irradiation with thermal neutrons in 1968 was a key step in stabilizing genes for crown (leaf) rust resistance from the Avena strigosa progenitor.

The final cross, MN89252/Gem, was made in the 1992 spring greenhouse. MN89252 is a Minnesota oat line tested in the 1991 Uniform Early Oat Performance Nursery. Gem was a Wisconsin cultivar that was released in 1996 and contained the 6X amphiploid and irradiated material mentioned above.

The pedigree method of plant breeding was strictly followed and the chronology of progeny generations resulting from the final cross, MN89252/Gem, is listed below:

Final cross	1992 spring greenhouse
F ₁ plants	1992 field nursery row 21093
F ₂ population (10-ft. row)	1993 field nursery row 16220
F ₃ line (5-ft. row)	1994 field nursery row 8477
F ₄ line (5-ft. row)	1995 field nursery row 6893
F ₅ line (5-ft. row)	1996 field nursery row 5087
F ₆ line (5-ft. row)	1997 field nursery row 3798

Individual panicles were selected from generations F₂ through F₅, then all plants in the 1997 F₆ line (row) 3798 were cut and threshed in bulk. This population was tested as selection X7822-3, which ultimately became Drumlin.

X7822-3 (F ₇)	1998: Preliminary yield trial at Madison (triplicated late-maturity series)
X7822-3 (F ₈)	1999: Advanced to main Madison performance trial, the Wisconsin statewide trials, and a small single plot increase (SPI)
X7822-3	2000: Continued in the Madison trial and the Wisconsin statewide trials, advanced to the drill plots (5 ft. x 40 ft. plots, four replications), and entered in the USDA Uniform Midseason Oat Performance Nursery (a large multi-state trial).
X7822-3	2001: Breeders Seed increase
X7822-3	2002: Foundation Seed increase
X7822-3	2003: Certified seed production; named Drumlin

The primary selection criteria, in the F₂ population and in later generations, were resistance to crown (leaf) rust, productive agronomic traits such as yield, and high grain (kernel) quality as measured by test weight, groat percentage, and kernel and groat characteristics.

Traits that were closely monitored in all performance trials were grain yield, test weight, straw strength, maturity, response to diseases, especially crown rust and barley yellow dwarf virus (BYDV), and grain quality factors such as groat percentage and groat protein percentage. High yields, good test weights, good resistance to crown rust, and good tolerance to BYDV all characterized the performance X7822-3 (Drumlin).

The field of Breeders Seed increase (2001) and the Foundation Seed production field (2002) were inspected repeatedly by the foundation seed program field inspectors. Drumlin has demonstrated stability for all phenotypic and genotypic plant characteristics consistent with normal environmental influences.

The kernels of Drumlin are well filled, yellow in color, and nonfluorescent.

Drumlin has been uniform and stable, and has had no "variants" or "off-types" noted since the line was advanced to the main performance trial at Madison in 1999. At that time it was an F₈ and has since been grown an additional four generations through 2003.

The variety name "Drumlin" was checked with USDA, prior to naming and release, and it was indicated at that time that there were no known conflicts with other variety names.

Figure 1. Pedigree and chronology of crosses for Drumlin oat.

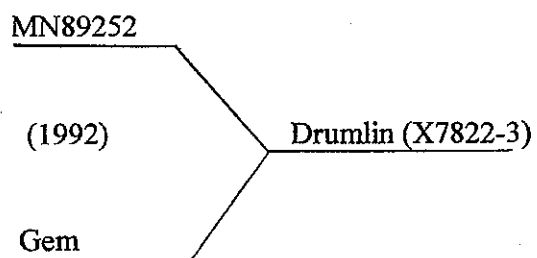


Exhibit B
Drumlin Oat
Wisconsin

EXHIBIT B: NOVELTY STATEMENT

Drumlin is most similar to the previously existing variety Vista. Drumlin and Vista are very similar in maturity and have some common ancestors in their backgrounds. Drumlin differs from Vista in the following ways:

1. Drumlin has consistently shown much more tolerance to Barley Yellow Dwarf Virus (BYDV) in tests conducted at the University of Illinois in 2001, 2002, and 2003. The tests each year consisted of readings from two replications and were rated on a scale of 0-9, with a lower number indicating better tolerance to the disease.

<u>Year</u>	<u>Drumlin</u>	<u>Vista</u>
2003	1.0	5.5
2002	3.5	6.0
2001	4.0	6.5

2. Drumlin has been consistently, significantly shorter than Vista as indicated in the height (inches) readings given in the table below. The data is taken from trials grown at the indicated locations in Wisconsin during 2003.

	Arlington	Chilton	Lancaster	Marshfield	Sturgeon Bay
Vista	50.8	38.3	44.5	33.5	38.5
<u>Drumlin</u>	<u>46.0</u>	<u>36.0</u>	<u>41.3</u>	<u>30.3</u>	<u>35.3</u>
Ht. diff.	4.8	2.3	3.2	3.5	3.2
Entries	24	34	34	34	34
Reps	4	4	4	4	4
L.S.D. .05	1.73	1.44	1.34	2.26	2.02
C.V. %	2.60	2.84	2.29	5.13	3.97

BELTSVILLE, MARYLAND 20705
OBJECTIVE DESCRIPTION OF VARIETYOAT
(Avena spp.)

NAME OF APPLICANT(S) Wisconsin Alumni Research Foundation	VARIETY NAME OR TEMPORARY DESIGNATION DRUMLIN (X7822-3)
ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code) 614 North Walnut Street P.O. Box 7365 Madison, Wisconsin 53707-7365	FOR OFFICIAL USE ONLY PVPO NUMBER 20 0400062

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. or) when number is either 99 or less.

1. SPECIES:

1 = SATIVA

2 = BYZANTINA

3 = OTHER (Specify) _____

2. GROWTH HABIT:

1 = WINTER

2 = SEMIWINTER

3 = SPRING

JUVENILE GROWTH:

1 = PROSTRATE

2 = SEMIPROSTRATE

3 = ERECT

STANDARD VARIETIES

1 = JAYCEE

2 = CLINTLAND 64

3 = CAYUSE

4 = NORLINE

5 = YANCEY

6 = FLORIDA 501

3. MATURITY (50% flowering):

DAYS EARLIER THAN

STANDARD VARIETY

DAYS LATER THAN

STANDARD VARIETY

Season:

1 = VERY EARLY (Jaycee)

2 = EARLY (Nodaway 70)

3 = MIDSEASON (Clintford)

4 = LATE (Lodi)

5 = VERY LATE (Garry)

6 = EXTREMELY LATE (Mackinaw)

4. PLANT HEIGHT (From soil level to top of head):

CM. TALL

CM. SHORTER THAN

STANDARD VARIETY

CM. TALLER THAN

STANDARD VARIETY

VISTA

DANE

5. STEM:

DIAMETER:

1 = FINE (Kherson)

2 = MEDIUM (Clintford)

3 = COARSE (Nodaway 70)

HAIRINESS AT UPPER CULM NODES:

1 = HAIRLESS

2 = HAIRY

MATURE STEM COLOR:

1 = YELLOW

2 = REDDISH

6. LEAF: (Leaf Color: The Royal Horticultural Society's or any recognized color chart should be used to determine the leaf color of the described variety.)

CARRIAGE:

1 = DROOPING (Random)

2 = ERECT (Walken)

COLOR:

1 = YELLOW GREEN

2 = LT. GREEN

3 = DK. GREEN

4 = BLUE GREEN

MM. WIDTH (First leaf below flag leaf)

LEAF MARGIN:

1 = GLABROUS

2 = CILIATE

LIGULE:

1 = ABSENT

2 = PRESENT

LEAF SHEATH:

1 = HAIRLESS

2 = HAIRY

7. HEAD:

PANICLE SHAPE:

1 = EQUILATERAL

2 = INTERMEDIATE

3 = SIDE PANICLE (Unilateral)

ATTACHMENT OF LOWER WHORL OF BRANCHES:

1 = FIRST NODE

2 = SECOND NODE (False node)

PANICLE SIZE:

1 = SMALL (Yancey)

2 = MEDIUM (Walken)

3 = LARGE (Markton)

PANICLE WIDTH:

1 = NARROW (Gopher)

2 = MIDBROAD (Yancey)

3 = BROAD (Nodaway 70)

CM. PANICLE LENGTH

NUMBER OF BRANCHES

NUMBER OF WHORLS OF BRANCHES

POSITION OF BRANCHES:

1 = ASCENDING (Yancey)

2 = SPREADING (Cayuse)

3 = DROOPING (Markton)

4 = PECTINATE (White Tartar)

5 = CONFUSED (Storm King)

8. RACHIS:

☒ 2 1 = RECURVED (Yancey) 2 = ERECT (Walken) ☒ 1 8 MM. SECOND FLORET RACHILLA SEGMENT LENGTH
☒ 1 SECOND FLORET RACHILLA SEGMENT: 1 = HAIRLESS 2 = HAIRY ☒ - RACHILLA HAIRS: 1 = SHORT 2 = LONG

9. SPIKELET:

☒ 3 SPIKELET SEPARATION BY: 1 = ABSCISSION 2 = SEMIABSCISSION 3 = FRACTURE
☒ 1 FLORET SEPARATION BY: 1 = DISARTICULATION 2 = HETEROFRACTURE 3 = BASIFRACTURE
☒ 2 8 FLORETS PER SPIKELET (mean no.)

10. GLUMES: (Glume Color: The Royal Horticultural Society's or any recognized color chart should be used to determine the color of the described variety)

☒ 0 8 MM. WIDTH ☒ 2 3 MM. LENGTH ☒ 1 0 NO. OF VEINS ON GLUMES ☒ 2 COLOR: 1 = WHITE 2 = YELLOW 3 = RED 4 = STRIPE

11. LEMMA: (Lemma Color: The Royal Horticultural Society's or any recognized color chart should be used to determine the color of the described variety)

☒ 1 6 MM. LENGTH ☒ 2 COLOR: 1 = WHITE 2 = YELLOW 3 = RED 4 = GRAY 5 = BLACK
☒ 1 HAIRINESS OF DORSAL SURFACE: 1 = HAIRLESS 2 = HAIRY

12. AWN (First floret):

☒ 2 OCCURENCE: 1 = ABSENT (Walken) 2 = INFREQUENT (Yancey) 3 = COMMON (Chilocco) 4 = FREQUENT (Random)
☒ 2 TYPE: 1 = NON-TWISTED 2 = TWISTED 3 = TWISTED GENICULATE
☒ 2 1 MM. AWN LENGTH

13. SEED:

☒ 2 FLORESCENCE UNDER ULTRAVIOLET LIGHT: 1 = FLORESCENT 2 = NON-FLORESCENT
☒ 1 BASAL HAIR: 1 = ABSENT (Florida 501) 2 = ABSENT TO FEW (Yancey) 3 = FEW TO SEVERAL (Lee) 4 = SEVERAL TO NUMEROUS (Florilee) 5 = NUMEROUS (Red Rustproof)
☒ - - MM. BASAL HAIR LENGTH
☒ 3 7 7 GMS. PER 1,000 SEEDS ☒ 2 8 MG. GROAT WEIGHT (each)
☒ 1 5 6 % GROAT PROTEIN ☒ 0 4 9 % GROAT OIL

14. INSECTS: (0 = NOT TESTED, 1 = SUSCEPTIBLE, 2 = RESISTANT)

☒ 0 CEREAL LEAF BEETLE ☒ 0 BLUEGRASS BILLBUG ☒ 0 GRAIN BUG (C. Sayi) ☒ 0 NEMATODE (Type) _____
☒ 0 GREEN BUG (Biotype) _____ OTHER (Specify) _____

15. DISEASE: (0 = NOT TESTED, 1 = SUSCEPTIBLE, 2 = RESISTANT)

☒ 0 HALO BLIGHT ☒ 0 POWDERY MILDEW ☒ 0 SEPTORIA LEAF BLOTCH ☒ 0 SOIL-BORNE MOSIAC
☒ 0 HELMINTHOSPORIUM LEAF BLOTCH ☒ 1 YELLOW DWARF VIRUS ☒ 0 VICTORIA BLIGHT ☒ 0 OTHER (Specify) _____

SPECIFY RACES TESTED:

	RACES SUSCEPTIBLE	RACES RESISTANT
<input checked="" type="checkbox"/> CROWN RUST.....	CR 13	CR 192, 181, 185, 223, 225
<input checked="" type="checkbox"/> STEM RUST.....	NA 25, 27, 28, 55, 67	NA 8, 16
<input type="checkbox"/> COVERED SMUT.....		
<input checked="" type="checkbox"/> LOOSE SMUT.....		BULK COLLECTION GENERAL TO MN AND IL

16. INDICATE VARIETY YOU BELIEVE MOST CLOSELY TO RESEMBLE THAT SUBMITTED:

CHARACTER	VARIETY	CHARACTER	VARIETY
PLANT TILLERING	VISTA	LEAF COLOR	GEM
LEAF SIZE	VISTA	LEAF CARRIAGE	MORaine
SEED COLOR	MORaine	SEED SHAPE	GEM

COMMENTS:

20 0400062

DRUMLIN

A New, High-Yielding, Mid-Late
Maturity Oat from Wisconsin

DRUMLIN is a new high yielding oat variety developed at the University of Wisconsin-Madison. **DRUMLIN** is a mid-late maturity oat that heads about 1 day later than Gem, about 3 days earlier than Belle, and about the same time as Vista. In 20 statewide trials (8 locations/3 years) during 2001-2003, **DRUMLIN** had higher average grain yield than all other named varieties tested. These grain yields are summarized below and by individual location on the back page. **DRUMLIN** is similar to Dane for test weight and to Gem for plant height. **DRUMLIN** has shown good resistance to crown rust and good tolerance to BYDV.

SEED AVAILABLE FOR ON-FARM PLANTING IN 2004

- ▶ High Grain Yield
- ▶ Good Test Weight
- ▶ Mid-Late Maturity
- ▶ Resistant to Crown Rust
- ▶ Good Tolerance to BYDV

Agronomic Performance and Disease Characteristics of DRUMLIN OATS at Ag Research Stations in Wisconsin, 2001-2002-2003

	Grain yield bu/a	Bu. Wt. lbs.	Head Date	Plant ht. in.	Lodging 0-100	Crown rust 0-100	Smut R/S	BYDV 0-9	Groat %	Groat protein %
No. of tests	20	19	14	19	10	2	3			
Drumlin (mid-late)	122.6	35.9	6/28.7	38.5	55.8	2.8	R	2.8	med	med
Belle (late)	111.8	36.6	7/1.3	38.6	30.3	6	R	4.8	high	low
Dane (early)	109.8	35.9	6/22.7	36.2	33.5	35.0	R	6.8	med	med
Gem (mid)	112.4	36.3	6/27.6	38.6	48.2	10.0	I	4.3	med	med
Jim (early)	108.0	37.4	6/24.9	38.3	39.8	25.8	—	5.2	med	med
Moraine (early)	110.1	36.4	6/25.3	40.3	46.9	5.8	R	5.2	med	med
Ogle (mid)	114.4	34.7	6/26.7	37.8	38.9	33.1	S	4.2	med	med
Richard (mid)	111.5	35.2	6/27.4	41.8	29.9	3.1	R	4.5	med	med
Vista (mid-late)	110.8	34.9	6/29.2	40.9	46.6	10.3	R	6.0	med	low

DRUMLIN is a licensed variety and Plant Variety Protection has been applied for. All seed sold must be labeled as DRUMLIN.



Yield of DRUMLIN OATS IN WISCONSIN

3 YEAR AVERAGE (2001, 2002, 2003) BUSHEL PER ACRE

Test Locations	DRUMLIN Yield (bu/acre)	Dane (Early)	Moraine (Early)	Gem (Mid)	Vista (Mid)	Belle (Late)
Adelphi	167.8	166.8	161.0	151.5	163.7	
Madison	124.2	130.5	130.1	129.8	134.7	
Lancaster	109.1	111.5	107.9	120.7	114.3	
Marshfield	85.1	82.2	91.3	92.5	79.4	
Chilton	88.6	85.8	87.1	82.5	90.7	
Sturgis Bay	100.4	97.7	116.9	105.2	102.9	
Spooner	80.8	79.4	79.9	78.1	76.3	
Ashland ¹	94.2	102.1	95.7	104.9	106.7	
Average	109.8	110.1	112.4	110.8	111.8	

1: 2002-2003 data only.

2: 2001-2002 data only.

3: 2001 data only.

DRUMLIN IS A LICENSED VARIETY
(PVPA 1994 APPLIED FOR)

Ask your seed dealer for Wisconsin Certified

For more information contact:

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Paul E. Ehrhardt, or James C. Albertson
Department of Agronomy
College of Agricultural and Life Sciences
University of Wisconsin-Madison
1575 Linden Drive
Madison, WI 53706
(608)262-1390



20 0400 062
NEW FROM
WISCONSIN!

DRUMLIN OATS



Developed and Released by
Department of Agronomy
College of Agricultural and Life Sciences
University of Wisconsin-Madison

Exhibit D
Drumlin Oat
Wisconsin

EXHIBIT D: ADDITIONAL DESCRIPTION OF DRUMLIN

Drumlin is classified as Avena sativa L. Plants are intermediate to tall in height with leaves of medium length. The open, equilateral panicle is intermediate in length and panicle branches droop slightly at maturity. Spikelets separate from their pedicles by fracture, and florets separate by disarticulation of these rachilla segments. Lemma are glabrous and awns are infrequent. The caryopsis (groat) is retained in the lemma and palea, and grain color is yellow. Drumlin is of late maturity.

An intent to release request was made to the WCIA Seed Certification Committee in spring of 2003, and upon approval, the first seed was distributed to Certified growers in late March, 2003. Yield and agronomic data for 2000, 2001, and 2002 are summarized in Tables 1 and 2 in the intent to release letter. Additional yield performance data for 2001, 2002, and 2003 are summarized in Table 3.

Wisconsin Oat Test Line X7822-3

Wisconsin oat test line X7822-3 has a pedigree of MN89252 / Gem. The final cross was made in the spring greenhouse at Madison in 1992. It has been tested statewide since 1999 and in the drill plot nursery since 2000. X7822-3 has also been an entry in the Uniform Midseason Oat Performance Nursery (UMOPN) in 2000, 2001, and 2002. This nursery is grown at many locations in the northern USA and southern Canada and measures range of adaptability over a wide growing area.

In statewide tests, X7822-3 has had consistently high grain yields, ranking 1st in 2002, 2001-2002, and 2000-2002. Test weights are similar to those of Belle, while heading date is about 1 day later than Gem, 2 days earlier than Belle, and about equal to Vista. Plant height is about the same as Gem. Lodging is somewhat higher than Gem and Vista and could be a concern on fertile soils. BYDV tolerance is very good and comparable to that of Ogle. Crown rust resistance is good.

In the UMOPN trials of 2000 and 2001, X7822-3 recorded average groat percentage, above average groat protein percentage, and relatively low oil percentage.

X7822-3 was entered in the Minnesota state-wide trials in 2001 and 2002 and was one of the better performing entries in that multi-location test for both years.

Breeders Seed was grown in 2001 and Foundation Seed in 2002 in anticipation of release as a new variety. The name "Drumlin" has been suggested and is awaiting approval.

Table 1. Grain yields (bu/a) for eight oat varieties and Wisconsin test selection X7822-3 in trials at eight Wisconsin locations in 2000, 2001, and 2002.

Variety	Arl Drill Plots	Madison	Ash- land	Lan- caster	Marsh- field	Spooner	Sturgeon Bay	Chilton	8-loc. mean
No. of tests	3	3	2	3	2	3	3	3	22
X7822-3	160.1	138.2	126.5	114.4	81.8	90.5	132.7	84.0	117.1
Belle	149.5	126.4	113.8	93.0	64.0	79.0	112.4	84.3	104.1
Dane	147.9	118.5	105.3	96.5	66.9	85.0	113.1	73.4	102.2
Gem	146.6	124.1	107.8	95.1	69.5	83.3	123.3	76.5	104.6
Jim	153.7	123.5	96.6	90.6	59.3	84.2	120.5	74.2	102.4
Moraine	153.5	127.2	115.6	97.8	67.9	84.9	108.5	76.3	105.1
Ogle	141.4	117.2	112.4	93.5	69.2	84.5	125.0	66.7	102.2
Richard	153.3	130.2	106.0	97.6	57.1	82.8	95.9	72.6	101.1
Vista	141.2	122.2	113.1	101.7	80.8	82.8	117.4	79.4	105.5
Mean	149.7	125.3	110.8	97.8	68.5	84.1	116.5	76.4	104.9
L.S.D..05	4.5	5.4	8.5	6.6	8.2	7.6	8.9	6.6	2.4

Table 2. Grain yield, agronomic, and disease characteristics for eight oat varieties and Wisconsin test selection X7822-3 in multiple statewide tests during 2000, 2001, and 2002.

Variety or Selection	Yield bu/a	Test wt. lbs/bu	Head date	Ht. in.	Lodging 0-100	BYDV 0-9	Crown rust 0-100
No. of tests	22	21	19	21	12	3	4
X7822-3	117.1	35.4	6/27.1	39.5	58.8	4.2	3.8
Belle	104.1	35.8	6/29.7	39.4	28.2	5.2	2.2
Dane	102.2	35.1	6/20.6	36.6	34.1	7.0	41.9
Gem	104.6	35.5	6/26.0	39.5	50.0	5.2	11.6
Jim	102.4	37.1	6/22.3	38.9	37.5	5.5	29.1
Moraine	105.1	36.1	6/22.8	40.0	42.8	5.5	6.6
Ogle	102.2	34.0	6/24.5	38.0	38.9	4.7	44.7
Richard	101.1	34.8	6/25.3	42.4	27.6	5.0	3.1
Vista	105.5	34.5	6/27.5	41.4	46.7	6.5	14.6
Mean	104.9	35.4	6/25.1	39.5	40.5	5.4	17.5

TABLE 3. YIELD SUMMARY OF OAT VARIETIES GROWN IN PERFORMANCE TRIALS AT SEVERAL LOCATIONS IN WISCONSIN, 2001-2003.

OAT GRAIN YIELD (B/A)									
VARIETY OR SELECTION	INDIVIDUAL LOCATIONS								MULTI-LOC. AVG. R
	ARL.	MAD.	ASH-	LAN-	MARSH-	SPOO-	STURG	CHIL	
	DRILL PLOTS	NUR.	LAND	CASTER	FIELD	NER	-EON BAY	-TON	
ONE YEAR OAT SUMMARY---2003 ONLY.									6 LOC.
BELLE	174.5	145.1		150.0	90.9		103.0	124.5	131.3 7
DANE	182.0	117.8		123.8	100.5		93.0	128.4	124.3 11
DRUMLIN	187.5	141.9		166.2	116.3		120.2	148.9	146.8 1
GEM	171.2	134.9		129.2	110.0		106.1	127.2	129.8 8
JIM	180.3	135.2		137.4	91.9		90.8	123.9	126.6 10
LEONARD	167.9	138.4		165.0	121.8		110.6	131.0	139.1 2
MORaine	180.4	132.2		129.3	93.4		80.9	127.2	123.9 12
OGLE	175.8	131.6		150.8	108.4		126.8	134.9	138.1 3
RICHARD	184.6	142.1		148.5	109.3		90.1	135.8	135.1 4
SESQUI	171.8	128.9		147.9	129.6		89.5	131.1	133.1 6
VISTA	164.2	134.4		157.0	105.0		99.7	118.0	129.7 9
WABASHA	174.4	134.6		156.1	117.0		98.1	126.2	134.4 5
AVERAGE	176.2	134.8		146.8	107.8		100.7	119.9	132.7
L.S.D. .05	10.9	13.3		13.3	12.7		14.6	9.0	5.0
NO. OF REPS	4	4	0	4	4	0	4	4	
TWO-YEAR OAT SUMMARY---2002, 2003.									13 LOC.
BELLE	167.1	147.2		131.4	79.4	54.1	95.2	99.3	114.9 5
DANE	177.3	134.3		115.9	85.1	62.4	80.0	98.5	111.1 9
DRUMLIN	177.3	146.8		142.8	97.6	72.8	111.3	111.6	126.7 1
GEM	166.7	140.0		115.9	91.3	66.0	99.9	93.1	113.9 6
JIM	172.1	138.6		118.4	77.4	52.1	83.4	93.4	109.1 11
MORaine	168.8	139.9		115.8	82.2	60.1	79.6	96.3	109.6 10
OGLE	169.1	137.6		128.9	91.5	58.1	112.9	95.5	117.6 2
RICHARD	171.4	140.8		130.6	88.4	66.7	90.1	100.7	116.2 3
SESQUI	165.3	136.8		125.5	100.0	63.1	92.4	97.9	115.3 4
VISTA	153.0	140.6		135.9	92.5	64.5	91.5	91.8	113.5 8
WABASHA	166.5	135.9		121.8	92.7	59.8	94.9	96.3	113.5 7
AVERAGE	168.6	139.9		125.7	88.9	61.8	93.7	97.7	114.7
L.S.D. .05	6.8	7.8		9.9	7.7	10.7	11.1	6.2	3.2
NO. OF YEARS	2	2	0	2	2	1	2	2	
THREE-YEAR OAT SUMMARY---2001, 2002, 2003.									20 LOC.
BELLE	163.7	134.7	106.7	114.3	79.4	76.3	102.9	90.7	111.8 4
DANE	167.8	124.2	94.2	109.1	85.1	80.8	100.4	88.6	109.8 8
DRUMLIN	172.4	137.4	114.3	129.8	97.6	87.7	119.8	96.6	122.6 1
GEM	161.0	130.1	95.7	107.9	91.3	79.9	116.9	87.1	112.4 3
JIM	168.7	129.2	79.8	105.9	77.4	78.1	101.1	84.9	108.0 9
MORaine	166.6	130.5	102.1	111.5	82.2	79.4	97.7	85.8	110.1 7
OGLE	163.6	126.9	101.7	117.9	91.5	79.6	121.4	85.1	114.4 2
RICHARD	168.5	130.5	102.9	116.8	88.4	83.1	92.2	86.7	111.5 5
VISTA	151.5	129.8	104.9	120.7	92.5	78.1	105.2	82.5	110.8 6
AVERAGE	164.9	130.4	100.3	114.9	87.3	80.3	106.4	87.6	112.4
L.S.D. .05	5.4	6.1	12.0	7.5	7.7	9.1	9.3	5.6	-2.7
NO. OF YEARS	3	3	1	3	2	2	3	3	

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE**EXHIBIT E**
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) Wisconsin Alumni Research Foundation	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER X7822-3	3. VARIETY NAME Drumlin
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country) 614 North Walnut Street P.O. Box 7365 Madison, Wisconsin 53707-7365	5. TELEPHONE (Include area code) (608) 263-2500	6. FAX (Include area code) (608) 263-1064
7. PVPO NUMBER		20 04 00 06 2

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. ☒ YES ☐ NO9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☒ YES ☐ NO10. Is the applicant the original owner? ☐ YES ☒ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☒ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (Trace ownership from original breeder to current owner. Use the reverse for extra space if needed):

Applicant received all right, title, and interest in Drumlin Oat variety by a Memorandum Agreement (enclosed) executed by the breeders Heidi Kaeppler and Ronald Duerst.

~~This invention (cultivar) was made (developed) with United States government support awarded by the following agencies: USDA/GSREES 03-CRHF-0-6055. The United States has certain rights in this invention.~~Per Correspondence of 8/16/2004
mat 8/10/2004**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 0.1 hour per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, marital or family status, political beliefs, parental status, or protected genetic information. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

PLANT VARIETY PROTECTION CERTIFICATE APPLICATION
IN THE UNITED STATES PLANT VARIETY PROTECTION OFFICE

Attorney Docket No.: 3261.02US01

Examiner: Mark A. Hermeling

Application No.: 200400062

Filed: 20 January 2004

For: 'DRUMLIN' OAT

AMENDMENT

Commissioner for Plant Variety Protection
Plant Variety Protection Office
NAL Building, Room 401
10301 Baltimore Avenue
Beltsville, MD 20705-2351

Sir:

In response to your 15 July 2004 letter, amendment to the above-identified plant variety protection certificate application is requested.

In Exhibit E, Block 11, please delete the following:

"This invention (cultivar) was made (developed) with United States government support awarded by the following agencies: USDA/GSREES 03-CRHF-0-6055. The United States has certain rights in this invention."

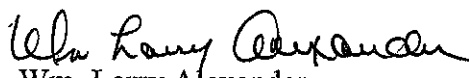
The USDA has no ownership rights to the instant cultivar and the foregoing, now deleted, statement was in error. All title to the instant cultivar is held by Wisconsin Alumni Research

Application No. 200400062

Foundation. Therefore, USDA need not be listed as a co-owner of the instant cultivar.

Dated: 6 August 2004

Respectfully submitted,

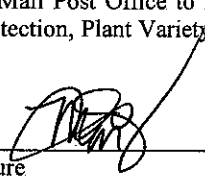

Wm. Larry Alexander
Attorney for Owner

Patterson, Thuyente, Skaar & Christensen, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 349-5757

CERTIFICATE OF EXPRESS MAIL

"Express Mail" mailing label number EL671580565US. Date of Deposit: August 6, 2004. I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service on the date indicated above and is addressed to the Commissioner for Plant Variety Protection, Plant Variety Protection Office, NAL Building, Room 401, 10301 Baltimore Avenue, Beltsville, MD 20705-2351.

MAI LEE VANG
Name of Person Making Deposit


Signature

WISCONSIN ALUMNI RESEARCH FOUNDATION
MEMORANDUM AGREEMENT

This Memorandum Agreement is entered into by and between each of the persons executing this Agreement below as an Inventor, or Author in the case of copyrightable materials, (hereinafter referred to collectively as "**Inventor**") and the Wisconsin Alumni Research Foundation (hereinafter referred to as "**WARF**"), a nonstock, nonprofit Wisconsin corporation.

WHEREAS, at least one of said persons referred to here in as Inventor is currently, or at the time of the creation of the Technology (referred to below), was associated with the University of Wisconsin-Madison (hereinafter referred to as the "**University**") as a faculty or staff member, employee, student or otherwise;

WHEREAS, WARF is the patent management agency of the University and as such is designated by the University to accept ownership of the Technology transferred to it because of Inventor's association with the University at the time the Technology was created;

NOW, THEREFORE, in consideration of the mutual promises set forth herein and other good and valuable consideration, the sufficiency of which is hereby acknowledged, the parties agree as follows:

Section 1. Declaration.

Inventor declares that Inventor has invented, discovered, written, or otherwise created, either solely or jointly with others, certain technology identified by WARF Ref. No. P03266US DRUMLIN OAT VARIETY. The technology, including any patentable, copyrightable or trademarkable subject matter contained therein, related biological or other materials or compounds, germplasm, know-how, drawings, supporting writings and records, computer software (including both object code and source code versions thereof), materials useful for design (for example, logic manuals, flow charts, and principles of operation), and the like created jointly or solely by Inventor shall be hereinafter referred to collectively as the "**Technology**."

Section 2. Warranties.

Inventor declares that Inventor has provided an accurate, complete and full disclosure of all information with respect to all aspects of the Technology of which Inventor is aware. Inventor further declares that no conflict exists with regard to the rights of third parties (e.g. entities with which Inventor has consulting agreements, sponsored research agreements, material transfer agreements, etc.) which would in any way restrict Inventor's ability to claim and to transfer to WARF all of Inventor's right, title, and interest in the Technology.

Section 3. Assignment.

Inventor hereby assigns to WARF all of Inventor's right, title, and interest in the Technology. Inventor agrees to execute any memoranda of assignment or other documents that WARF deems to be necessary or useful for recording purposes or otherwise establish and/or verify WARF's rights under the terms of this assignment. Inventor further agrees to provide, at WARF's request, samples of physical materials and copies of drawings, supporting writings and records, and computer software (including source code) useful or necessary to protect and practice the Technology.

Section 4. Consideration.

A. **Patent, Copyright or Other Property Rights.** With respect to the Technology, WARF agrees to prepare, file, and prosecute such patent applications, applications for registration of copyright or trademark, plant variety protection or breeder's rights, or other intellectual property rights as WARF in its sole discretion deems prudent (hereinafter collectively referred to as the "**Intellectual Property Rights**"). WARF further agrees to exert such reasonable efforts to promote the Technology, whether by granting patent, trademark or copyright licenses or by pursuing commercialization through confidential disclosure arrangements or otherwise, as WARF may deem appropriate. WARF shall bear all of the expense WARF incurs in its attempts to obtain the Intellectual Property Rights and/or to license or otherwise generate income from the Technology. Inventor agrees to cooperate in the preparation and prosecution of any application for Intellectual Property Rights filed by or on behalf of WARF and in any litigation or other proceedings involving any such Intellectual Property Rights. If approved in advance, WARF will defray reasonable out-of-pocket travel, living and sundry expenses incurred by Inventor for such activities.

B. **Licensing and other Royalty Revenues.** WARF agrees to pay to Inventor, and any joint inventors of the Technology who also assign the Technology to WARF, a total of twenty percent (20%) of the Net Royalty Revenues realized by WARF under the terms of any license under the Technology granted by WARF or from the sale of the Technology or any part thereof. "**Net Royalty Revenues**" shall be deemed to consist of monies actually received by WARF as a royalty under each agreement governing the sale or license of the Technology (e.g., as license fees, earned royalties or other cash proceeds from the sale of equity received by WARF in exchange for rights under the Technology) less: (1) any ordinary revenue deductions, such as taxes or royalty sharing payments made to third parties; and (2) any expenditures made by WARF in proceedings with third parties, such as interference proceedings, oppositions, reexamination proceedings (unless initiated by WARF independent of a third party challenge to a patent), litigation, and arbitrations and payments made in settlement of any such proceedings. Net Royalty Revenues shall not include sponsored research funds provided to the University by a Licensee, or reimbursements for domestic and foreign filing fees, maintenance fees and other patent, trademark or copyright expenses paid to WARF for the cost of filing, prosecuting, and maintaining domestic and foreign Intellectual Property Rights. Expenditures as described in (2) above incurred in any given year may be carried over by WARF and applied against money actually received by WARF in subsequent years until such expenditures are fully reimbursed. Money actually recovered by WARF with respect to any proceedings with third parties, which are not reimbursed expenses, shall be included in Net Royalty Revenues and shared when received by WARF, in the same way as royalties for a license granted under the Technology. If WARF receives equity in a licensee entity under the terms of a license agreement, such equity shall be held in WARF's name until such time as WARF, in its sole discretion, shall determine that the shares should be redeemed or sold. Such amounts shall then be added to Net Royalty Revenues shared with the Inventor. Payments due to the Inventor shall be allocated and made in the manner set forth in Section 5 herein.

Section 5. Allocation of Income and Payment.

A. **Allocation.** In the event WARF owns and licenses or sells more than one Intellectual Property Right with respect to the Technology, and/or licenses multiple technologies in the same contract, WARF shall have the right to allocate a proportion of any Net Royalty Revenues generated by such license to each separate Intellectual Property Right and/or technology. In any such case, all of the Inventors in the aggregate shall be considered a single entity for distribution of Net Royalty Revenues under Section 4B. Absent contrary, unanimous instructions in writing from the Inventor and any such

joint inventors, and subject to WARF's right to allocate a proportion of Net Royalty Revenues to each separate Intellectual Property Right and/or technology, the distribution of Net Royalty Revenues under Section 4B shall be divided equally among the Inventors.

B. Payment. Inventor is responsible for notifying WARF of his or her current address and for updating that information, as appropriate. WARF shall have discharged its obligations to any named Inventor if it directs payments to the Inventor at the last address provided to WARF by Inventor. However, if payment is not deliverable to the last address provided, WARF shall contact the chairperson, director or other head of the Inventor's department to attempt to obtain a current address for Inventor. If WARF is unable to obtain a current address by contacting Inventor's department, payments not deliverable will be held by WARF and be available to the Inventor, if claimed within one (1) year of the date of WARF's letter transmitting the original check. After one (1) year, uncashed checks from WARF to Inventor shall become void and WARF's payment obligation to Inventor shall be discharged. In the event that the Inventor contacts WARF with a current address after a period in which WARF had no current address for the Inventor, WARF shall resume paying royalties in the next calendar quarter but WARF is under no obligation to pay royalties for prior calendar quarters during which WARF had no current address for the Inventor. Any monies not paid out by WARF to Inventor will be paid to the department or center with which the Inventor was associated at the time the Technology was developed.

Section 6. Improvements.

Inventor agrees to disclose promptly and to assign to WARF all Improvements of any aspect of the Technology conceived of or made by Inventor as part of Inventor's activity as a faculty or staff member, employee, student or through other association with the University, either solely or jointly with another, while Inventor is still associated with the University and for six months thereafter. "Improvements" as used herein shall refer to all additional technology not a part of the Technology if such additional technology requires the use of any of the claims of any patent or patent application that covers all or any part of the Technology or constitutes a Derivative Work of a writing that forms a part of the Technology, together with any technology the practice of which is necessary to the commercial practice of the Technology, as defined above, including but not limited to patentable subject matter, biological materials, know-how, drawings, supporting writings and records, computer software (including source code), and the like. "Derivative Work" as used herein shall refer to any alteration, correction, modification, update, revision or enhancement of the Technology that corrects errors, supports new releases or operating systems, improves operability, supports new models or input/output devices with which the Technology is designed to operate, substantially improves functionality, or basic capability or otherwise updates the content of the Technology.

Section 7. Technology Use by Inventor.

A. Continued Research. WARF and Inventor desire that Inventor and persons under Inventor's supervision, or working cooperatively with Inventor, shall be free to continue research in the field of the Technology. Therefore, nothing in this Agreement shall be deemed to restrict Inventor's right to use all or any part of the Technology for research and/or educational purposes, whether alone or in concert with another person or organization. No license to use the Technology for commercial purposes by the Inventor or the Inventor's sponsors is hereby granted either expressly or by implication.

B. Publication. Nothing in this Agreement, shall be deemed to restrict Inventor's right to publish all or any part of Inventor's past, present, or future research results. However, Inventor agrees to

promptly notify WARF of all past publications disclosing the Technology or Improvements and to use Inventor's best efforts to notify WARF of all future publications disclosing the Technology or Improvements as far in advance of their publication as possible.

Section 8. Miscellaneous.

The parties hereto have executed this Agreement on the dates indicated below in witness of the obligations and rights set forth above. This Agreement shall inure to the benefit of and be binding upon the heirs, personal representatives, successors, and assigns of each of the parties. A party's interest in this Agreement may be assigned provided that the personal obligations to WARF of Inventor and any other inventor, author, other creator or contributor of and to the Technology shall continue without change. This Agreement shall be effective between WARF and each Inventor when both of them have executed this Agreement where indicated, below, without regard to the dates of signing of other Inventors.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement.

WISCONSIN ALUMNI RESEARCH FOUNDATION

B. Z. Renk

WARF Representative: Bryan Z. Renk
Title: Director of Patents and Licensing

Date: 4/17/03

Heidi Kaeppler
Inventor Signature

Date: 4/25/03

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Ronald Duerst
Inventor Signature

Date: 4-30-03

Inventor Name: Ronald Duerst

HOME Address: 2202 Tawhee Drive
Madison, WI 53711

Social Security Number: 392-44-9452

Inventor Signature

Date: _____

Inventor Name:

HOME Address:

Social Security Number: